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PLANT PEST CONTROL BRANCH

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KHAPRA BEETLE (TROGODERMA GRANARIUM)

The khapra beetle has recently been found to be infesting grain in several warehouses in southern California, Arizona, and New Mexico. In an effort to obtain information that might assist in the control of this insect, the available literature has been reviewed and correspondence conducted by State and Federal people with entomologists in countries in which it is known to be present. The more important information, together with our own observations in warehouses in this country, is briefly summarized as follows:

The adult khapra beetle is from 2 to 3 millimeters in length and from 3/4 to 1-1/2 millimeters in breadth. The body is subparallel and moderately convex. The adult beetles vary in color from a reddish brown to black, sometimes with the thorax and abdomen and the legs and antennae pale brown. The larvae are of the usual dermestid shape and appearance, usually light brown in color and covered with long bristly hair which extends well beyond the abdomen. The size of the larvae varies according to the instar of which there are four to five. The pupal period is spent in the cast skin of the last instar. The eggs are usually laid singly and often loosely among the grain, occasionally they may be laid in the grooves of the grain and under such conditions several may be deposited together. The eggs hatch in from 3 to 15 days depending on the temperature. The larvae period varies from 15 to 90 days with an average at optimum temperatures (85° - 90°F.) of around 40 to 50. The life cycle is completed in from 35 to 150 days. Thus, several generations may occur each year. It is altogether probable under conditions that exist in the southwest that all stages of the insect will be found throughout the year.

This insect is known to occur in India, Ceylon, Malaya, Holland, Denmark, England, Germany, France, Russia, China, Japan, Korea, Australia, Madagascar, and the Philippine Islands. In most of these countries it is considered to be the most serious and destructive of the stored grain pests. In addition to grain, the insect feeds on stored nuts and will develop on dried blood, dead insects, mice, etc. In England it is a serious problem in breweries where it has been found to destroy the malt in the surface 18 to 20 inches. In this country, it has been found feeding on wheat, oats, barley, flax, alfalfa seed, pinto beans and black-eyed peas. Literature indicates rice to be one of its chief hosts. Infestations are heaviest in the top 30 inches of the grain mass, but penetration down to 9 feet is frequent. According to one reference, the larval hairs may cause trouble if swallowed.

In all of the countries in which this insect is known to occur and from which we have had reports, control is difficult. While this insect prefers hot, dry climates, the larvae can survive a certain amount of freezing and have been known to live for several years without food. Judging from available data, this beetle would seem to be well adapted to life in a large part of the southern United States.

The larvae of Trogoderma granarium molt frequently. The cast skins will be found among the grain varying from light brown to colorless skin-like particles. When one lets the infested material sift through his fingers, he will find his hands covered with a dust like substance and many cast skins which seem to adhere to the hand by the spines with which they are covered. There seems to be no characteristic feeding signs by which infestations of this pest can be separated from infestations of other storage insects. The larvae of Trogoderma granarium may gnaw on the outside of the grain or tunnel into the kernels.

When larval growth is complete they seem to leave the grain piles in great numbers and concentrate on sills, stud braces, and cracks and crevices in the walls and floor of the grain bins. If cracks occur completely through the wall or floor, the larvae or pupae may be found in great numbers underneath the floor or on the outside of the bins. In some instances many cast skins have been observed in cobwebs about the building.

Several entomologists who have visited infested warehouses in this country have expressed the opinion that this is the most destructive pest of stored products they have ever seen.

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